IN THE CLAIMS:

Please amend claims 3-6, 8, 11-14, and 16 as follows.

1. (Cancelled).

2. (Previously Presented) A receiving method in a direct conversion receiver, the method comprising:

receiving a signal comprising multiple components at different receiving frequencies belonging to a frequency band;

mixing at least one of the received signal components into a corresponding base band signal comprising I- and Q branches;

converting the analog base band signal into a digital signal;

measuring power levels of the signal components in the digital signal in pairs, where a first component in a pair belongs to an upper sideband of the frequency band and a second component in the pair belongs to a lower sideband of the frequency band;

estimating, when either the upper sideband component or the lower sideband component dominates in power over another component in the pair, a frequency-independent phase imbalance, a frequency-dependent phase imbalance and a gain imbalance;

compensating the estimated frequency-independent phase imbalance, the frequency-dependent phase imbalance and the gain imbalance to at least one of the I- and Q-branch signals

wherein the estimating further comprises

transforming the I- and Q-signals into frequency domain using a discrete Fourier transform or a fast Fourier transform to provide signals X(f) and Y(f); and

estimating the frequency-dependent phase imbalance and the frequency-independent phase imbalance from the phase of the cross-spectrum (X(f)Y*(f)),

wherein X(f) and Y(f) denote the corresponding base band signals.

3. (Currently Amended) ~~The method of claim 2,~~ A receiving method in a direct conversion receiver, the method comprising:

receiving a signal comprising multiple components at different receiving frequencies belonging to a frequency band;

mixing at least one of the received signal components into a corresponding base band signal comprising I- and Q branches;

converting the analog base band signal into a digital signal;

measuring power levels of the signal components in the digital signal in pairs, where a first component in a pair belongs to an upper sideband of the frequency band and a second component in the pair belongs to a lower sideband of the frequency band;

estimating, when either the upper sideband component or the lower sideband component dominates in power over another component in the pair, a frequency-independent phase imbalance, a frequency-dependent phase imbalance and a gain imbalance;

compensating the estimated frequency-independent phase imbalance, the frequency-dependent phase imbalance and the gain imbalance to at least one of the I- and Q-branch signals

wherein the estimating further comprises

transforming the I- and Q-signals into frequency domain using a discrete Fourier transform or a fast Fourier transform to provide signals X(f) and Y(f); and

estimating the frequency-dependent phase imbalance and the frequency-independent phase imbalance from the phase of the cross-spectrum (X(f)Y*(f)),

wherein X(f) and Y(f) denote the corresponding base band signals,

wherein the estimating comprises estimating the frequency-dependent phase imbalance and the frequency-independent phase imbalance from the phase of the averaged cross-spectrum <X(f)Y*(f)>.

4. (Currently Amended) ~~The method of claim 2,~~ A receiving method in a direct conversion receiver, the method comprising:

receiving a signal comprising multiple components at different receiving frequencies belonging to a frequency band;

mixing at least one of the received signal components into a corresponding base band signal comprising I- and Q branches;

converting the analog base band signal into a digital signal;

measuring power levels of the signal components in the digital signal in pairs, where a first component in a pair belongs to an upper sideband of the frequency band and a second component in the pair belongs to a lower sideband of the frequency band;

estimating, when either the upper sideband component or the lower sideband component dominates in power over another component in the pair, a frequency-independent phase imbalance, a frequency-dependent phase imbalance and a gain imbalance;

compensating the estimated frequency-independent phase imbalance, the frequency-dependent phase imbalance and the gain imbalance to at least one of the I- and Q-branch signals,

wherein the estimating comprises estimating signal component-specific frequency-dependent phase imbalances when either the upper or the lower sideband signal component present in the pair dominates in power over the another component, and

estimating the frequency-independent phase imbalance as an average over the component-specific frequency-dependent phase imbalances.

5. (Currently Amended) ~~The method of claim 2,~~ A receiving method in a direct conversion receiver, the method comprising:

receiving a signal comprising multiple components at different receiving frequencies belonging to a frequency band;

mixing at least one of the received signal components into a corresponding base band signal comprising I- and Q branches;

converting the analog base band signal into a digital signal;

measuring power levels of the signal components in the digital signal in pairs, where a first component in a pair belongs to an upper sideband of the frequency band and a second component in the pair belongs to a lower sideband of the frequency band;

estimating, when either the upper sideband component or the lower sideband component dominates in power over another component in the pair, a frequency-independent phase imbalance, a frequency-dependent phase imbalance and a gain imbalance;

compensating the estimated frequency-independent phase imbalance, the frequency-dependent phase imbalance and the gain imbalance to at least one of the I- and Q-branch signals,

wherein the estimating comprises estimating signal component-specific frequency-dependent phase imbalance factors when either the upper or the lower sideband signal component in the pair dominates in power over the another component; and

estimating the frequency-dependent phase imbalance as half of a difference between the component-specific frequency-dependent phase imbalance factors.

6. (Currently Amended) ~~The method of claim 2,~~ A receiving method in a direct conversion receiver, the method comprising:

receiving a signal comprising multiple components at different receiving frequencies belonging to a frequency band;

mixing at least one of the received signal components into a corresponding base band signal comprising I- and Q branches;

converting the analog base band signal into a digital signal;

measuring power levels of the signal components in the digital signal in pairs, where a first component in a pair belongs to an upper sideband of the frequency band and a second component in the pair belongs to a lower sideband of the frequency band;

estimating, when either the upper sideband component or the lower sideband component dominates in power over another component in the pair, a frequency-independent phase imbalance, a frequency-dependent phase imbalance and a gain imbalance;

compensating the estimated frequency-independent phase imbalance, the frequency-dependent phase imbalance and the gain imbalance to at least one of the I- and Q-branch signals,

wherein the estimating comprises estimating signal component-specific frequency-dependent phase imbalances when either the upper or the lower sideband signal component of the pair dominates in power over the another component; and

estimating the frequency-independent phase imbalance from one or several of the component-specific frequency-dependent phase-imbalances by fitting techniques.

7. (Previously Presented) The method of claim 2, wherein the compensating comprises compensating for the frequency-dependent phase imbalance and for the gain imbalance by digital filtering.

8. (Currently Amended) ~~The method of claim 7,~~ A receiving method in a direct conversion receiver, the method comprising:

receiving a signal comprising multiple components at different receiving frequencies belonging to a frequency band;

mixing at least one of the received signal components into a corresponding base band signal comprising I- and Q branches;

converting the analog base band signal into a digital signal;

measuring power levels of the signal components in the digital signal in pairs, where a first component in a pair belongs to an upper sideband of the frequency band and a second component in the pair belongs to a lower sideband of the frequency band;

estimating, when either the upper sideband component or the lower sideband component dominates in power over another component in the pair, a frequency-independent phase imbalance, a frequency-dependent phase imbalance and a gain imbalance;

compensating the estimated frequency-independent phase imbalance, the frequency-dependent phase imbalance and the gain imbalance to at least one of the I- and Q-branch signals,

wherein the compensating comprises compensating for the frequency-dependent phase imbalance and for the gain imbalance by digital filtering,

wherein the compensating comprises compensating for the frequency-independent phase imbalance by subtracting the frequency independent phase imbalance from the outcome of the digital filtering.

9. (Cancelled).

10. (Previously Presented) A direct conversion receiver, comprising:

receiving means for receiving a signal comprising multiple components at different receiving frequencies belonging to a frequency band;

mixing means for mixing at least one of the received signal components into a corresponding base band signal comprising I- and Q branches;

converting means for converting the analog base band signal into a digital signal;

measuring means for measuring power levels of the signal components in the digital signal in pairs, where a first component in a pair belongs to an upper sideband of the frequency band and a second component in the pair belongs to a lower sideband of the frequency band;

estimating means for estimating, when either the upper sideband component or the lower sideband component dominates in power over another component in the pair, a frequency-independent phase imbalance, a frequency-dependent phase imbalance and a gain imbalance; and

compensating means for compensating the estimated frequency-independent phase imbalance, the frequency-dependent phase imbalance and the gain imbalance to at least one of the I- and Q-branch signals

wherein the estimating means is configured to

transform the I- and Q-signals into frequency domain using discrete Fourier transform or fast Fourier transform to provide signals X(f) and Y(f); and

estimate the frequency-dependent phase imbalance and the frequency-independent phase imbalance from the phase of the cross-spectrum (X(f)Y*(f)),

wherein X(f) and Y(f) denote the corresponding base band signals.

11. (Currently Amended) ~~The direct conversion receiver of claim 10,~~ A direct conversion receiver, comprising:

a receiver configured to receive a signal comprising multiple components at different receiving frequencies belonging to a frequency band;

a mixer configured to mix at least one of the received signal components into a corresponding base band signal comprising I- and Q branches;

a converter configured to convert the analog base band signal into a digital signal;

a measuring unit configured to measure power levels of the signal components in the digital signal in pairs, where a first component in a pair belongs to an upper sideband of the frequency band and a second component in the pair belongs to a lower sideband of the frequency band;

an estimator configured to estimate, when either the upper sideband component or the lower sideband component dominates in power over another component in the pair, a frequency-independent phase imbalance, a frequency-dependent phase imbalance and a gain imbalance; and

a compensator configured to compensate the estimated frequency-independent phase imbalance, the frequency-dependent phase imbalance and the gain imbalance to at least one of the I- and Q-branch signals

wherein the estimator is configured to

transform the I- and Q-signals into frequency domain using discrete Fourier transform or fast Fourier transform to provide signals X(f) and Y(f); and

estimate the frequency-dependent phase imbalance and the frequency-independent phase imbalance from the phase of the cross-spectrum (X(f)Y*(f)),

wherein X(f) and Y(f) denote the corresponding base band signals,

wherein the ~~estimating means~~ estimator is configured to estimate the frequency-dependent phase imbalance and the frequency-independent phase imbalance from the phase of the averaged cross-spectrum $\langle X(f)Y^*(f)\rangle$.

12. (Currently Amended) ~~The direct conversion receiver of claim 10,~~ A direct conversion receiver, comprising:

a receiver configured to receive a signal comprising multiple components at different receiving frequencies belonging to a frequency band;

a mixer configured to mix at least one of the received signal components into a corresponding base band signal comprising I- and Q branches;

a converter configured to convert the analog base band signal into a digital signal;

a measuring unit configured to measure power levels of the signal components in the digital signal in pairs, where a first component in a pair belongs to an upper sideband of the frequency band and a second component in the pair belongs to a lower sideband of the frequency band;

an estimator configured to estimate, when either the upper sideband component or the lower sideband component dominates in power over another component in the pair, a frequency-independent phase imbalance, a frequency-dependent phase imbalance and a gain imbalance; and

a compensator configured to compensate the estimated frequency-independent phase imbalance, the frequency-dependent phase imbalance and the gain imbalance to at least one of the I- and Q-branch signals,

wherein the estimator ~~estimating means~~ is configured to[[:]]

estimate signal component-specific frequency-dependent phase imbalances when either upper- or lower sideband signal component present in the pair dominates in power over the another component; and

estimate the frequency-independent phase imbalance as an average over the component-specific frequency-dependent phase imbalances.

13. (Currently Amended) ~~The direct conversion receiver of claim 10,~~ A direct conversion receiver, comprising:

a receiver configured to receive a signal comprising multiple components at different receiving frequencies belonging to a frequency band;

a mixer configured to mix at least one of the received signal components into a corresponding base band signal comprising I- and Q branches;

a converter configured to convert the analog base band signal into a digital signal;

a measuring unit configured to measure power levels of the signal components in the digital signal in pairs, where a first component in a pair belongs to an upper sideband of the frequency band and a second component in the pair belongs to a lower sideband of the frequency band;

an estimator configured to estimate, when either the upper sideband component or the lower sideband component dominates in power over another component in the pair, a frequency-independent phase imbalance, a frequency-dependent phase imbalance and a gain imbalance; and

a compensator configured to compensate the estimated frequency-independent phase imbalance, the frequency-dependent phase imbalance and the gain imbalance to at least one of the I- and Q-branch signals,

wherein the estimator ~~estimating means~~ is configured to[[:]]

estimate signal component-specific frequency-dependent phase imbalance factors when either the upper- or the lower sideband signal component in the pair dominates in power over the another component; and

estimate the frequency-dependent phase imbalance as a half of the difference between the component-specific frequency-dependent phase imbalance factors.

14. (Currently Amended) ~~The direct conversion receiver of claim 10,~~ A direct conversion receiver, comprising:

a receiver configured to receive a signal comprising multiple components at different receiving frequencies belonging to a frequency band;

a mixer configured to mix at least one of the received signal components into a corresponding base band signal comprising I- and Q branches;

a converter configured to convert the analog base band signal into a digital signal;

a measuring unit configured to measure power levels of the signal components in the digital signal in pairs, where a first component in a pair belongs to an upper sideband

of the frequency band and a second component in the pair belongs to a lower sideband of the frequency band;

an estimator configured to estimate, when either the upper sideband component or the lower sideband component dominates in power over another component in the pair, a frequency-independent phase imbalance, a frequency-dependent phase imbalance and a gain imbalance; and

a compensator configured to compensate the estimated frequency-independent phase imbalance, the frequency-dependent phase imbalance and the gain imbalance to at least one of the I- and Q-branch signals,

wherein the estimator ~~estimating means~~ is configured to[[:]]

estimate signal component-specific frequency-dependent phase imbalances when either the upper- or the lower sideband signal component of the pair dominates in power over the another component; and

estimate the frequency-independent phase imbalance from one or several of the component-specific frequency-dependent phase-imbalances by fitting techniques.

15. (Previously Presented) The direct conversion receiver of claim 10, wherein the compensating means is configured to:

compensate for the frequency-dependent phase imbalance and for the gain imbalance by digital filtering.

16. (Currently Amended) ~~The direct conversion receiver of claim 15,~~ A direct conversion receiver, comprising:

a receiver configured to receive a signal comprising multiple components at different receiving frequencies belonging to a frequency band;

a mixer configured to mix at least one of the received signal components into a corresponding base band signal comprising I- and Q branches;

a converter configured to convert the analog base band signal into a digital signal;

a measuring unit configured to measure power levels of the signal components in the digital signal in pairs, where a first component in a pair belongs to an upper sideband of the frequency band and a second component in the pair belongs to a lower sideband of the frequency band;

an estimator configured to estimate, when either the upper sideband component or the lower sideband component dominates in power over another component in the pair, a frequency-independent phase imbalance, a frequency-dependent phase imbalance and a gain imbalance; and

a compensator configured to compensate the estimated frequency-independent phase imbalance, the frequency-dependent phase imbalance and the gain imbalance to at least one of the I- and Q-branch signals,

wherein the compensator is configured to compensate for the frequency-dependent phase imbalance and for the gain imbalance by digital filtering,

wherein the ~~compensating means~~ compensator is ~~if~~ configured to[[:]] compensate for the frequency-independent phase imbalance by subtracting the frequency independent phase imbalance from the outcome of the digital filtering.

17. (Previously Presented) A direct conversion receiver, comprising:

a receiver configured to receive a signal comprising multiple components at different receiving frequencies belonging to a frequency band;

a mixer configured to mix at least one of the received signal components into a corresponding base band signal comprising I- and Q branches;

an analog-to-digital converter configured to convert the analog base band signal into a digital signal;

wherein the receiver comprises

a measuring unit configured to measure power levels of the signal components in the digital signal in pairs, where a first component in the pair belongs to an upper sideband of the frequency band and a second component in the pair belongs to a lower sideband of the frequency band;

an estimator configured to estimate, when either the upper sideband component or the lower sideband component dominates in power over another component in the pair, a frequency-independent phase imbalance, a frequency-dependent phase imbalance and a gain imbalance; and

a compensator configured to compensate the estimated frequency-independent phase imbalance, the frequency-dependent phase imbalance and the gain imbalance to at least one of the I- and Q-branch signals;

wherein the estimator further comprises

a transformer configured to transform the I- and Q-signals into frequency domain using a discrete Fourier transform or a fast Fourier transform to provide signals X(f) and Y(f); and

an estimator configured to estimate the frequency-dependent phase imbalance and the frequency-independent phase imbalance from the phase of the cross-spectrum (X(f)Y*(f)),

wherein X(f) and Y(f) denote the corresponding base band signals.